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A FOCUS ON ANALYSIS OF ICT INFRASTRUCTURE AVAILABILITY, COMPUTER LITERACY AND DATA PROTECTION OF ICT USERS IN THE E-GOVERNANCE

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Abstract
*E-Gover**nance** is the transformation of government to provide Efficient, Convenient and Transparent Services to the Citizens and Businesses through Information and Communication Technologies. E-Governance is a Process, it refers Development of Computerized Databases and Dissemination of Information through normal channels or Web technology is E-Government. Enforcement of laws for timely delivery of services to citizens, Business and other Govt.offices through Internet or Intranet is E-Governance. A brief narration of this literature would like to discuss about the post implementation issues in E-Governance which focused on the Availability of ICT infrastructure, Computer Literacy and Data Protection/Maintenance in the E-Governance. It is compared between the Government and Quasi-Government, Officers and Staff, Male and Female and different age-group- wise. This study will serve as an useful background for the practitioners and implementers of E-Governance for the State Government of Tamil Nadu.*

Key Words: E-Governance, ICT Infrastructure, Computer Literacy, Data Protection And Maintenance.

INTRODUCTION

E-Government is not about 'e' but about government; E-Government is not about computers but about citizens; E-Government is not about *translating* processes but about *transforming* processes. The key challenges with E-Governance are not the TECHNOLOGY issues but, they are the ORGANIZATIONAL issues [7] CSR Prabhu 2004 et al.. Infrastructure: *Just acquiring computers is not enough. People should be aware of their potential and should acquire skill of using them optimally.* Tendency to resist the change in work culture: *Using a computer instead of type writer and using email, instead of telephone cannot be treated as change in work culture. Something more is required.* E-Governance is expected to touch all aspects of governance – economic, social and administrative, identification and prioritization of e-Governance projects assumes great significance. A mindset for 'e' and a step-wise approach is a recipe for starting small but building up on successes.

SCOPE OF THE STUDY

The study is conducted for the Government of Tamil Nadu which is one among the southern States of India. The Tamil Nadu state has 32 districts and still backward in E-Governance. Though there are several E-Governance projects that are implemented in Government of Tamil Nadu, the departments like Revenue, Police, Agriculture, Medical, Education, etc, are still have some practical issues which affect the E-Governance processes. This study has been focused on the post implementation/operational issues and to provide solutions to overcome these issues. In fact, the officials of the Government are new to the Computer they are yet to use it comfortably with the adequate computer knowledge. This study includes the absence or less importance allocated to variables such as Computer literacy, availability of the ICT infrastructure, actions taken to maintain systems, and provide adequate security to available Data by employees of the government are covered. The systematic approach and analysis, by which addressing these issues the E-Governance processes in Government Departments will improve better delivery of services and the Officials could get more awareness on Data protection and Maintenance.

OBJECTIVES

- To assess the availability of ICT infrastructure facilities for sustaining e-governance projects.
- To assess the level of Computer Literacy of the Government employees
- To assess the measures provided on Data Security and ICT infrastructure maintenance
- To change the attitude of Government Departments
- Lack of coordination between Govt. Department and Solution developers
- Resistance to re-engineering of departmental processes
- Lack of Infrastructure for sustaining e-governance projects on national level
- Manage and Update content on govt. websites efficiently and regularly

METHODOLOGY

This study covers the Analysis of ICT infrastructure availability, Computer Literacy and Data Protection of ICT Users in the E-Governance. A Questionnaire was designed after conducting pilot study. The questionnaire was canvassed among the samples. The Purposive sampling technique is used. The collected data were analysed by classifying and tabulating on the basis of the sub-categories of the samples, viz., Type of organization, Gender, Designation and Age. Since the study focuses the practical issues, the samples are formed from the Employees of serving in Government and Quasi Government offices. The distribution of the sample based on the sample sub-categories are given in the table under the sub-heading "Study".

RELATED WORK

There are several research areas which give an important contribution for the basis of this study. Developed countries are studying Information System Implementation problems for a long time and now developing countries as well. Some of the related researches are listed as follows:

1. [2] Baten, M. A. & Kamil, A. A. (2010) et al. have pointed out that according to the survey of Bangladesh central bank named Bangladesh bank, there are so many backdrops. For establishing technology based banking services, there are some drawbacks like an insufficient telephone connectivity, Costly internet connection, lack of IT literacy, cost of PCs, lack of skilled IT personnel in banking sector, and low investment. For implementing online banking there are also some necessary things left. Reliable and secure information infrastructure including telecommunication infrastructure are the strong network connection through the whole country. Also the ICT diffusions in the banking sector, skillful operational staff, legal and regulatory framework. In addition, there are several steps that are considered in order to speed up the adoption of e-banking. Internet diffusion is a key term for the development of e-banking. Developing countries like Bangladesh:- the important thing of these sectors are that most of the Bangladeshi people are adapted with traditional banking system. It is very hard for the government or domestic private sector to pool financial resources for developing e-banking infrastructure in Bangladesh. Not only the limitation of infrastructure facility, but also some problems like skilled manpower. There are lots of difficulties to collect the desire information. Disclosing the information is very restricted. All the time the IT divisions of banks are not cooperative.

2. [4] Basu, S. (2004) et al. has elaborately discussed that the E-governance is more than just a government website on the Internet. The strategic objective of e-governance is to support and simplify governance for all parties; government, citizens and businesses. The use of ICTs can connect all three parties and support processes and activities. In other words, in e-governance, "electronic" means support and stimulate good governance. Therefore, the objectives of e-governance are similar to the objectives of good governance. However, as regards to the objective of e-government a distinction should be made between the objectives for internally focused processes (operations) and objectives for externally focused services. The external objective of e-government is to fulfil the public's needs and expectations satisfactory on the front-office side, by simplifying the interaction with various online services.

PROPOSED WORK

The proposed study mainly focuses on the analysis of ICT infrastructure availability, Computer Literacy and Data Protection of ICT Users in the E-Governance. As India is a growing country and especially the public servants of the State Government of Tamil Nadu are new the Computers they are unaware of using the Office software and even Internet and email facilities. It shows that inadequate knowledge in IT and in turn it affects the Public delivery system via Information Technology tools. Hence, to find out the issues and to provide the best solution, this study is proposed. Further, a Questionnaire was designed to collect data from Government employees. The coverage of the study is from Government and Quasi Government sectors. The sampling technique used is Purposive sampling. Since the study focuses the practical issues the samples are formed from the Employees of Government. There are plenty number of samples have been collected and out of which only 857 have been taken for analysis. The distribution of the sample based on the sample sub-categories like Type of Organisation, Designation and Gender wise.

Architecture of the study carried out viz. Analysis of ICT infrastructure availability, Computer Literacy and Data Protection of ICT Users in the E-Governance:

Figure-1

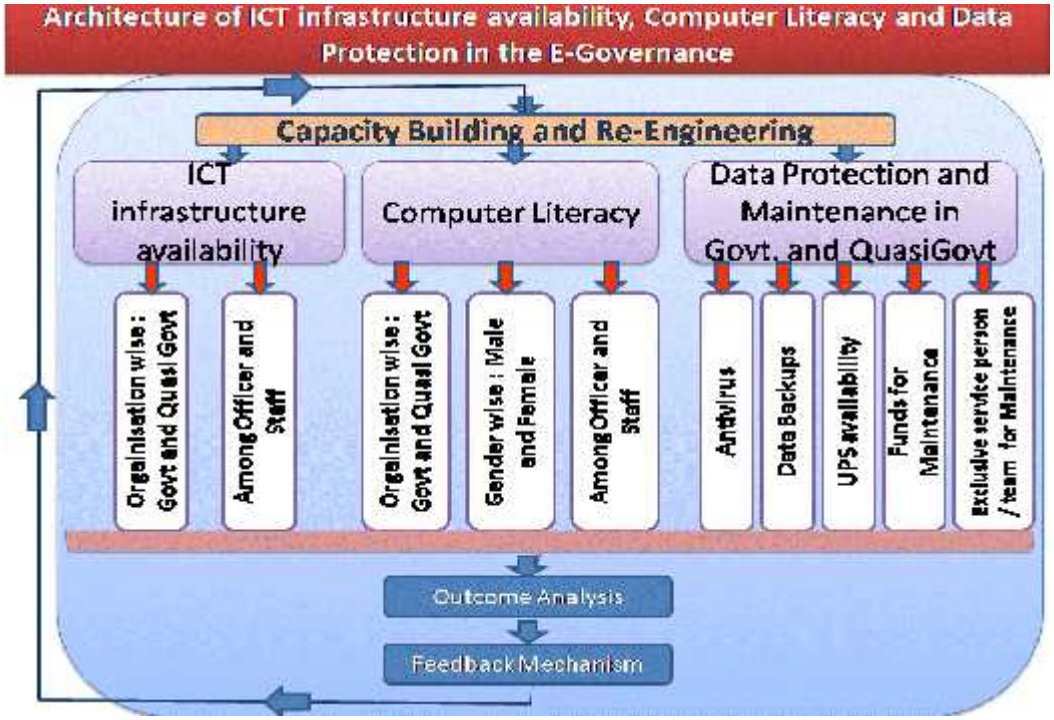

Figure-1 represents the analysis of ICT infrastructure availability, Computer Literacy and Data Protection of ICT Users in the E-Governance. Though the E Governance is implemented in many of the Government Departments, some practical issues still exists. Those issues have been analysed based on sample categories like ICT infrastructure availability, Computer Literacy, Data Protection and Maintenance and sub-categories like Type of Organisation, Designation and Gender wise.

VARIOUS FUNCTIONAL COMPONENTS ARE DESCRIBED BELOW

ICT infrastructure availability: This is an important aspect in the study; the E-Governance will be achieved only with the help of ICT infrastructures. The samples were analysed with its sub categories like Type of Organisation : Govt. Vs Quasi Government and Officers Vs Staff. The outcome analysis will help us to find out the critical issues in wider angle, so that addressing and fixing these issues will be easier.

Computer Literacy: The samples are analysed with its sub categories like Type of Organisations: Govt. Vs Quasi Government, Gender: Male Vs Female and Officers Vs Staff. The outcome analysis will help us to find out the critical issues in wider angle, so that addressing and fixing these issues will be easier.

Data Protection and Maintenance*:* This is another important aspect in our study because the Employees are new to the Computer environment and they are not aware of Data Protection and Maintenance. Hence, we have collected the data to analyse these issues too. This is analysed with the samples collected under the sub category of Government and Quasi Government and variables like Antivirus, Data Backups, UPS availability, Funds for maintenance and an Exclusive Person/Team for maintenance.

The Outcome Analysis will be fed into the Feedback Mechanism which can help us to address these issues with more precisely.

Feedback Mechanism is steering to implement the process of Reengineering. Systematic starting over and reinventing the way to address the practical issues and gets its work done. Michael Hammer and James Champy (in their 1993 book 'Reengineering the Corporation') is defined as "Fundamental rethinking and radical redesign of business process to achieve

dramatic improvements in critical measures of performance such as cost, service, and speed." According to this theory the reengineering can be done in the appropriate time, so that our goal of the study will be achieved as targeted.

BRIEF ON STUDY

Though there are several analyses have been done on different aspects, here we have presented only few selective analyses and they are:

1. The availability of ICT infrastructure in the E-Governance among the Govt. sector and Quasi-Government sector; Officer and Staff were analysed.
2. The Computer Literacy among the Govt. sector and Quasi-Government sector; Male and Female; Officer and Staff; and Age wise were analysed.
3. The other important issues were analyzed with the available samples, ie Data Protection and Maintenance. These issues are most important and have to be addressed.

STUDY: E Governance: Post Implementation Practical Issues

The study of E Governance: Post Implementation Issues is conducted. The data are analysed on various variables like ICT infrastructure availability, Computer literacy and Data protection/Maintenance under the sub-categories Government and Quasi Government, Officer and Staff, Male and Female and Age-group-wise. Hypotheses are formed and various tests are administered. It is discussed in the following Tables:

Table 1: Computer Availability among Government and Quasi Government

Type of Organisation	Computer Availability		Total response (in nos)
	"YES" Response (in nos)	% to row total	
1	2	3	4
GOV	629	78	806
Qgov	47	92.2	51
Grand Total	676	78.9	857

Table 1 points out the computer availability status among employees from Government and Quasi government. It is seen that 78 percent of the persons selected from government sector are having computer while 92.2 percent from quasi Government sector are having computer. It points to the inference that more computer avialable in quasi government sector compared to government sector. The following hypothesis is set to test whether the difference in the proportion of computer literate between government and quasi government is statistically significant.

H_0 : There is no significant difference in the proportion of computer availability between governmnet and quasi government. To test the hypothesis Z test administered

Table- 1.1

Gov	0.780397
Qgov	0.921569
Pooled proportion	0.788798
SE of proportions	0.058935
Z	2.395398

Table- 1.2

Item	Govt	Qgov	Diff	Z value
Proportion of computer literate	0.780397	0.921569	0.141172	2.395398

Table 1.1 shows the calculated Z value is 2.39. The p value corresponding to the Z value is 0.0166. Since the p value is less than 0.05 at 5% level of significance. The null hypothesis is rejected.
The difference between the proportions is statistically significant.

It is inferred that availability of Computer is greater in Quasi Government than Government.

Table 2: Internet facility among Government and Quasi Government

Type of Organisation	Internet facility		Total response (in nos)
	"YES" Response (in nos)	% to row total	
1	2	3	4
GOV	565	70.1	806
Qgov	41	80.4	51
Grand Total	606	70.7	857

Table 2 shows that the Internet availability status among employees from Government and Quasi government. It is seen that 70.1 percent of the persons selected from government sector are having Internet facility while 80.4 percent from quasi Government sector are having Internet facility. It points to the inference that more Internet facility available in quasi government sector compared to government sector. The following hypothesis is set to test whether the difference in the proportion of Internet facility between government and quasi government is statistically significant.

H_0: There is no significant difference in the proportion of Internet facility available between government and quasi government.
To test the hypothesis Z test administered

Table - 2.1

Gov	0.700993
Qgov	0.803922
Pooled proportion	0.707118
SE of proportions	0.06571
Z	1.566418

Table 2.2

Item	Govt	Qgovt	Diff	Z value
Proportion of computer literate	0.700993	0.803922	0.102929	1.566418

Table 2.1 shows that the calculated Z value is 1.59. The p value corresponding to the Z value is 0.1173. Since the p value is more than 0.05 at 5% level of significance, the hypothesis is accepted.
The difference between the proportions is not statistically significant.
It is inferred that the availability of Internet facility is equal in Government and Quasi Government.

Table -3, MS-Office availability among Government and Quasi Government

Type of Organisation	MS Office		Total response (in nos)
	"YES" Response (in nos)	% to row total	
1	2	3	4
GOV	555	68.9	806
Qgov	44	86.3	51
Grand Total	599	69.9	857

Table - 3 points out the MS Office availability status among employees from Government and Quasi government. It is seen that 68.8 percent of the persons selected from government sector are having Windows OS facility while 86.3 percent from quasi Government sector are having MS Office. It points to the inference that more MS Office available in quasi government sector compared to government sector. The following hypothesis is set to test whether the difference in the proportion of MS Office available between governmnet and quasi government is statistically significant.

H_0 : There is no significant difference in the proportion of MS Office available between government and quasi government.
To test the hypothesis Z test administered

Table -3.1

Gov	0.688586
Qgov	0.862745
Pooled proportion	0.69895
SE of proportions	0.066234
Z	2.629462

Table- 3.2

Item	Govt	Qgovt	Diff	Z value
Proportion of computer literate	0.688586	0.862745	0.174159	2.629462

Table 3.1 shows that the calculated Z value is 2.62. The p value corresponding to the Z value is 0.0086. Since the p value is less than 0.05 at 5% level of significance, The null hypothesis is rejected.
The difference between the proportions is statistically significant.
It is inferred that availability of MS Office is more in Quasi Government than Government.

Table - 4 Computer Literate among Government and Quasi Government

Computer Literate by Type of Organisations			
Type of Organisation	**Computer Literate**		**Total response (in nos)**
	"YES" Response (in nos)	**% to row total**	
1	2	3	4
GOV	502	62.3	806
Qgov	40	78.4	51
Grand Total	542	63.2	857

Table 4 points out the computer literate status among employees from Government and Quasi government It is seen that 78.4 percent of the persons selected from quasi government sector are computer literate while 62.3 percent from Government sector are computer literate. It points to the inference that more computer literates are available in quasi government sector compared to government sector.

H_0 : There is no significant difference in the proportion of computer literates between government and quasi government The following hypothesis is set to test whether the difference in the proportion of computer literate between government and quasi government is statistically significant. To test the hypothesis Z test administered
Table 4.1

Gov	0.622829
Qgov	0.784314
pooled proportion	0.632439
SE of proportions	0.069616
Z	2.319638

Table 4.2

Item	Govt	Qgovt	Diff	Z value
Proportion of computer literate	0.6228	0.7843	0.1615	2.31

Table 4.1 shows that the calculated Z value is 2.31. The p value corresponding to the Z value is 0.02. Since the p value is less than 0.05 at 5% level of significance, the null hypothesis is rejected.The difference between the proportions is statistically significant.

It is inferred that the proportion of computer literacy is more in quasi government sector compared to government sector.

Table - 5 Computer Literate among Gender

Computer Literate by Gender			
Gender	**Computer Literate**		**Total response (in nos)**
	"YES"Response (in nos)	**% to row total**	
1	2	3	4
Male	339	66.7	508
Female	203	58.1	349
Grand Total	542	63.2	857

Table 5 shows Gender wise computer literacy status. 66.7 percent of the male samples have informed that they are computer literate while 58.1 percent of the female samples informed that they are using computers.

H_0 : There is no significant difference in the proportion of computer literates between male and female
To test the hypothesis Z test administered

Table - 5.1

Male	0.667323
Female	0.581662
pooled proportion	0.632439
SE of proportions	0.033521
Z	2.555424

Table 5.1 shows that the calculated Z value is 2.55. The p value corresponding to the Z value is 0.01 since the p value is less than 0.05 at 5% level of significance, the null hypothesis is rejected. The difference between the proportions is statistically significant.

It is inferred that the proportion of computer literacy is greater number in Male compared to Female.

Table – 6, Computer Literate among Officers and Staff

Computer Literate by Designation			
Designation	**Computer Literate**		**Total response (in nos)**
	"YES" Response (in nos)	**% to row total**	
1	2	3	4
Officer	65	55.1	118
Staff	477	64.6	739
Grand Total	542	63.2	857

Table 6 shows the computer literacy status of the officers and Staff. 55.1 percent of the officers selected for the study inform that they are using computers. 64.6 percent of the staff selected for the study state that they are using computers
H_0 : There is no significant difference in the proportion of computer literates between officers and staff
To test the hypothesis Z test administered

Table- 6.1

Officer	0.550847
Staff	0.645467
pooled proportion	0.632439
SE of proportions	0.047797
Z	1.979606

Item	Officer	Staff	Diff	Z value
Proportion of computer literate	0.5508	0.6454	0.0946	1.97

Table 6.1 shows that the calculated Z value is 1.97. The p value corresponding to the Z value is 0.04. Since the p value is less than 0.05 at 5% level of significance, the null hypothesis is rejected.

The difference between the proportions is statistically significant.
It is inferred that greater number of staff are using computers compared to officers

Another important factor that Data protection and System maintenance are two essential elements for a smooth and uninterrupted e-governance. As the failures of these two components may create a larger issue in E Governance, the study has been extended and samples have collected for analysis for Data protection and System maintenance. The samples were analysed by framing hypotheses and administered under the CHI-SQUARE tests.

Table - 7 , Data protection - Antivirus / Firewall- by Type of Organisation

		Data protection by Antivirus / Firewall		
		"Yes" Response (in nos)	"No" Response (in nos)	Total response
Type of Organisation	1	2	3	4
	GOV	286	520	806
	Qgov	36	15	51
	Grand Total	322	535	857

Expected numbers

"Yes" Response (in nos)	**"No" Response (in nos)**	**Total response**
1	**2**	**3**
303	503	806
19	32	51
322	535	857

H_0 : There is no association between Type of Organisations and Data protection by Antivirus / Firewall
Table 7 shows that the calculated X^2 value is 25.77. The corresponding 'p' value is 0.00
Since the 'p' value is less than 0.05, the hypothesis is rejected.

The data suggests the existence of association between type of organisation and data protection by antivirus / firewall.
From this sample, 70.59% of the persons from Quasi Government sector have mentioned that they are having Data protection where as in Government Sector 35.48% persons have mentioned that they are having Data protection

The inference is Quasi Government sector is having more awareness of data protection and taking more steps to protect data by installing Antivirus/Firewall compared to Government sector.

Table 8: Data Protection – Exclusive Service Persons for Maintenance - by Type of Organisation

		Exclusive service person / team for Maintenance			
		"Yes" Response (in nos)	"No" Response (in nos)	Total response	
Type of Organisation	1	2	3		
	GOV	235	571	806	
	Qgov	21	30	51	
	Grand Total	256	601	857	

Expected numbers		
"Yes" Response (in nos)	"No" Response (in nos)	Total response
1	2	3
241	565	806
15	36	51
256	601	857

H_0 : There is no association between Type of Organisation and Exclusive service person / team for maintenance.
Table 8 shows that the calculated X^2 value is 3.61. The corresponding 'p' value is 0.10
Since the 'p' value is greater than 0.05, the hypothesis is accepted.

The data suggests no association between type of organisation and Exclusive service person / team for maintenance
29 percent of the sampled persons from Government sector inform existence of exclusive servive persons for maintenance while 41 percent of the sampled persons from quasi Government accept the availability of exclusive service persons for maintenance of systems.

The inference is both Government and Quasigovernment sectors do not differ in appointing exclusive service person / team for system maintenance including Website update.

Result: In the study, the Quasi-Government staff is having more awareness of Data protection and System maintenance than Government staff. Also there is a lack of system maintenance in Government sector compared to Quasi Government sector. It has been found that there is no exclusive person/team is appointed for System Maintenance for Design /developme - nt/update/periodic maintenance, etc.

DISCUSSIONS

1. The Computer Literacy among the Govt. sector and Quasi-Government sector; Male and Female; Officer and Staff were analysed.
    a. It is seen that 78.4 percent of the persons selected from quasi government sector are computer literate while 62.3 percent from Government sector are computer literate. It points to the inference that more computer literates are available in quasi government sector compared to government sector.
    b. Gender wise computer literacy status were analysed. There are 66.7 percent of the male samples have informed that they are computer literate while 58.1 percent of the female samples informed that they are using computers. It is inferred that the Male are more computer literate than Female.
    c. Computer literacy status of the Officers and Staff. There are 55.1 percent of the officers selected for the study inform that they are using computers. 64.6 percent of the staff selected for the study state that they are using computers. It is inferred that greater number of staff are using computers compared to officers.
2. There are some other important issues were analyzed with the available samples, ie Data Protection and Maintenance. These issues are most important and to be addressed. It was analysed as samples collected viz. Antivirus, Daily Backups, UPS, Funds for maintenance and availability of Exclusive service person or team for Maintenance among the Govt. sector and Quasi Govt. sector.
    a. The inference is Quasi Government sector is having more awareness of data protection and taking more steps to protect data by installing Antivirus/Firewall compared to Government sector.
    b. The inference is Quasi Government sector is having practice of taking data backups daily more than compared to Government sector.
    c. The inference is Quasi Government sector is having more awareness of data protection by providing UPS compared to Government sector.
    d. The inference is Quasi Government sector is having better funds for maintenance compared to Government sector.
    e. The inference is both Government and Quasi Government sectors do not differ in appointing exclusive service person / team for system maintenance.
3. The Government sector staff should be given more computer awareness by giving more training to them on various applications.
4. It has been found that the Male staff are having greater knowledge of Computer than Female staff. Hence Female staff should be given enough training on IT and Office applications.
5. It has been found that Staff are using Computers more than Officers. Hence, the officers should be provided enough IT infrastructures and train them.
6. It has been found that Older age group ie above 40 is having lesser computer knowledge than Younger age group (<= 40). As the older age group is having sound knowledge of their routine works, only there is lack of computer knowledge to address these issues for the older age group. Hence, the Older age group have to be concentrated and trained on Computer. So that the productivity will increase.
7. Data Protection / Maintenance: Based on the samples some of the findings were done and solutions are furnished below to overcome this issues.Compared to Quasi Government sector, the Government sector should create more awareness to secure/protect their data from the threats by providing AntiVirus/Firewall, etc.

8. Both Government and Quasi Government sectors do not differ in appointing exclusive service person / team for system maintenance. For system maintenance and updating the data in the website an exclusive person or a team of persons which depends the work load ie. Design/development/update must be appointed to address this issue exclusively.

SUMMARY OF FINDINGS AND SOLUTIONS

The overall issues of ICT infrastructure availability, Computer Literacy and Data Protection of ICT Users in the E-Governance are:

1. Availability of ICT infrastructure: Government sector Vs Quasi Government sector and Officers Vs Staff.
2. Computer Literacy among the Government sector Vs Quasi Government sector.
3. Knowledge of Computer: Male Vs Female
4. Computer usage in Government Offices : Officer Vs Staff
5. Knowledge of Computer operation between Younger and Older age group
6. Data Protection and System maintenance among Government and Quasi Government
7. Lack of an exclusive System service/maintenance person for Design/development/update in both Government and Quasi Government.

In the study some of the key issues which are mentioned above are to be addressed with the following solutions.

1. In the study, in general the ICT infrastructure availability in Quasi Government is more than the Govt. sector.
2. In the study the Quasi-Government sector staff are more computer literate than Government sector. To improve the E Governance in the Government sector, the staff and officers are to be given more awareness of E Governance and enough training on usage of computer, internet, and email.
3. In the study, it has been found that Male is having more computer knowledge than Female. Hence, the Female should be given enough training to operate computers to execute the E Governance processes.
4. In the study, it has been found that Staff are using more Computer than Officer. The Officer should be encouraged to start using computers on their own and the confidence level to be increased for which the officers should be given enough training on computer. Also the officers are the mentors for their organization, they must be given training on overall IT which will help them to involve in E-Governance process including purchase of software and hardware.
5. In the study, the Younger age group is having more knowledge than Older age group in both Government and Quasi Government sectors. It may be due the younger group are entering the job with the computer knowledge. Hence, to balance this issue the older age group should be given the periodic training on computer.
6.
   a. In the study, the Quasi-Government staffs are having more awareness of Data protection and System maintenance than Government staff. These issues are important in the E Governance processes. If we are not serious, it may cause a major damage to the entire E-Governance. Hence, the Government sector should concentrate on the Data protection/security by taking backups regularly and providing Antivirus/Firewall, UPS to the system to protect from electric power surges.
   b. Also there is a lack of system maintenance in Government sector compared to Quasi Government sector. It has been found that there is a lack of funds for system maintenance in Government sector. Hence, there must be enough funds for system maintenance to be provided for Government sector.
   c. In the study another important issue in both Government sector and Quasi Government sector is there is no exclusive person is appointed for System Maintenance for Design/development/update/periodic maintenance, etc. For an example many of the Government and Quasi Government Websites are not designed for the staff and user requirements, and there is no further development and most important the websites are not updated with latest updates. In some places even backups are not mirrored properly in the servers. These issues will be addressed only by appointing a qualified system engineer / a team of engineers that depends the workload and work nature in the Government and Quasi-Government sectors.

CONCLUSION

As noted elsewhere, too many current ICT projects seem to take an 'anywhere but government' approach. They focus on telecasters, telemedicine, schools, and e-commerce but not on the core activities of government. Yet government remains at the heart of the development process. Unless it can be reformed – and e-governance has much to offer – then progress will be limited. Therefore use of ICTs to support government reform can be seen as a priority for e-governance. In general terms, priority human capacities for e-governance are 'hybrids': those who understand the technology *and* the business of

governance *and* the role of information in governance. Key implementation capacities to be developed for pilot projects would be likely to include:

- Enough ICT infrastructures to be provided to gear up the E-Governance in Government departments.
- Capacity building on E-Governance should also be given a high priority for attitudinal change since a key stumbling block to e-governance is the lack of motivation amongst those involved. Such training should aim to speak to both 'hearts and minds'.
- Capacity building to operate and maintain including Design/development/update website/information systems.
- E-Governance initiatives need to provide citizen interfaces in the respective local language. Thus, displays and keys should be based on localized interfaces and multi-media instructions should be commonly used to make the interface accessible in rural areas, where low literacy rates can be an obstacle.
- Capacity building to develop data protection/secured information systems.
- Capacity building to manage projects and to accept/manage change.
- Enough funding to be provided for maintenance. Simultaneously the other side user should have knowledge about Paperless process.
- School of E-Governance or its equivalent, would be likely to play a lead role in the training to develop human capacities

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